PATENT SPECIFICATION

Application Date: March 21, 1928. No. 8616/28. 310,157

Complete Left: Dec. 20, 1928.

Complete Accepted: April 25, 1929.

PROVISIONAL SPECIFICATION.

Improvements relating to Oil and other Liquid Coolers and Heaters and similar Heat Exchanging Apparatus.

We, SERCK RADIATORS LIMITED, a Company duly incorporated under the Laws of Great Britain, SYDNEY NELSON PURCHASE, a British Subject, and CHARLES OTTO WAGNER, of Russian Nationality, all of Warwick Road, Greet, in the City of Birmingham, do hereby declare the nature of this invention to be as follows:—

This invention relates to oil and other liquid coolers and heaters and similar heat exchanging apparatus of the type comprising a stack or group of tubes arranged within a container together with baffles or the like adapted to impart a circuitous course over the exterior of the tubes to the oil or other liquid to be raised or lowered in temperature by the heating or cooling medium flowing through said tubes.

With apparatus as aforesaid difficulties are frequently met in starting up the same in cold weather or under conditions causing a temporary increase in the viscosity of the liquid with a consequent increase in the pressure required to force it in a sinuous or circuitous course through the apparatus.

This invention comprises means as hereinafter described for avoiding said difficulties and for regulating the temperature of the liquid under treatment.

In accordance with this invention there is provided an alternative or bye-pass conduit between the ends of the container aforesaid such that the liquid under treatment may flow between the said ends, or from one to the other, without having to take a circuitous course over the tubes necessitated by the baffles. The said bye-pass or alternative conduit which may be along the centre of the container, is fitted with a valve for regulating the flow therethrough and so that either the whole or any desired part of the liquid passing through the apparatus may be directed through said bye-pass or alternative conduit. The said valve may be automatic in its action, and loaded with a spring or otherwise.

The said bye-pass or alternative conduit may be arranged in various ways. Thus for example, it may be formed by externally disposed piping connecting branches or bosses at two ends of the container and fitted with a central valve; or it may be formed integrally with the container, or with a unit or units comprising a group or groups of tubes inserted in the container.

In starting up the apparatus under low temperature or other conditions causing a temporary increase in the viscosity of the liquid to be treated, the valve is opened sufficiently to cause most of the liquid to be bye-passed. As the liquid gradually loses viscosity due to rising temperature the quantity flowing through the bye-pass is lessened by the regulation of the valve until the conditions are such as to permit of the entire closing of the bye-pass either by hand or automatically so that all the flow is by way of the sinuous or circuitous course through the container.

The bye-pass or alternative conduit as aforesaid serves also for the regulation of the temperature of the liquid leaving the apparatus, such regulation being effected by varying the proportions of the flow passing through the circuitous course and the bye-pass by adjustment of the valve of the latter which as mentioned, may be controlled either by hand or automatically.

Dated this 20th day of March, 1928.

MARKS & CLERK.

COMPLETE SPECIFICATION.

Improvements relating to Oil and other Liquid Coolers and Heaters and similar Heat Exchanging Apparatus.

We, SERCK RADIATORS LIMITED, a Company duly incorporated under the Laws of Great Britain, SYDNEY NELSON PURCHASE, a British Subject, and

[Price 1/-]

Price 4s 6d

Price 33p

CHARLES OTTO WAGNER, of Russian Nationality, all of Warwick Road, Greet, in the City of Birmingham, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to oil and other liquid coolers and heaters and similar heat exchanging apparatus of the type comprising a stack or group of tubes arranged within a container together with baffles or the like adapted to impart a circuitous course over the exterior of the tubes to the oil or other liquid to be raised or lowered in temperature by the heating or cooling medium flowing through said tubes.

With apparatus as aforesaid difficulties are frequently met in starting up the same in cold weather or under conditions causing a temporary increase in the viscosity of the liquid with a consequent increase in the pressure required to force it in a sinuous or circuitous course through the apparatus.

This invention comprises means as hereinafter described for avoiding said difficulties and for regulating the temperature of the liquid under treatment.

In the accompanying sheet of explanatory drawings:—

Figures 1 and 2 are sectional side elevations respectively showing two modes of applying our invention to an oil cooling apparatus.

The said apparatus is of known construction insofar as it includes the following features. Within the central body part *a* are arranged an annular group of tubes *b* along the centre of which group an axial space is left. The inlet to the body is indicated by *c* and the outlet by *d*. The oil to be cooled passes through the parts *c*, *d* and around the tubes. The cooling medium enters at *e* and passes out at *f*, after flowing through the tubes, the connections *e*, *f* being arranged in combination with the usual end boxes *g*, *h*.

In accordance with this invention there is applied to an oil or other cooler or heater of the above described type an alternative or bye-pass conduit between the ends of the container aforesaid such that the liquid under treatment may flow between the said ends, or from one, to the other, without having to take a circuitous course over the tubes necessitated by the baffles *i*. The said bye-pass or alternative conduit *j*, which may be along the centre of the container as shown in Figure 1, is fitted with a valve *k* for regulating the flow therethrough and so that either the whole or any desired part of the liquid passing through the apparatus may be directed through said bye-pass or alternative conduit. The valve *k* is automatic in its action, being loaded by a spring *l* or otherwise.

The said bye-pass or alternative conduit may be arranged in various ways. Thus, for example, it may be formed by an externally disposed channel *m* on the body connecting the inlet and outlet *c*, *d*, the channel being fitted with a valve *k* which is controlled by a spring *l* as shown in Figure 2, or by a weight.

In starting up the apparatus under low temperature or other conditions causing a temporary increase in the viscosity of the liquid to be treated, the valve automatically opens sufficiently under the pressure of the liquid to cause most of the liquid to be bye-passed. As the liquid gradually loses viscosity due to rising temperature the quantity flowing through the bye-pass is lessened by the closing of the valve by the spring until the conditions are such as to permit the flow to occur wholly or mainly along the sinuous or circuitous course through the container.

The bye-pass or alternative conduit as aforesaid serves also for the regulation of the temperature of the liquid leaving the apparatus, such regulation being effected by varying the proportions of the flow passing through the circuitous course and the bye-pass by adjustment of the valve. This adjustment is effected by adjusting the controlling force on the spring or weight. When it is desired to be able to adjust at any time the valve arranged as shown in Figure 1, the part containing the valve stem and spring is extended to project beyond the outer cover of the box *g* to afford convenient access thereto.

The invention is not limited to the examples above described and constructional details may be varied to meet different requirements.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In oil and other liquid coolers and heaters and similar heat exchanging apparatus, of the type specified, the employment of a bye-pass fitted with an automatic valve, substantially as described.

2. In oil and other liquid coolers and heaters and similar heat exchanging apparatus as claimed in Claim 1, the employment within or at the exterior of the apparatus, of a bye-pass connecting inlet and outlet portions and fitted with a spring or weight controlled valve, substantially as described.

3. In oil and other liquid coolers and

heaters and similar heat exchanging apparatus as claimed in Claim 1, means for automatically bye-passing fluid substantially as described and illustrated.

Dated this 6th day of December, 1928.

MARKS & CLERK.

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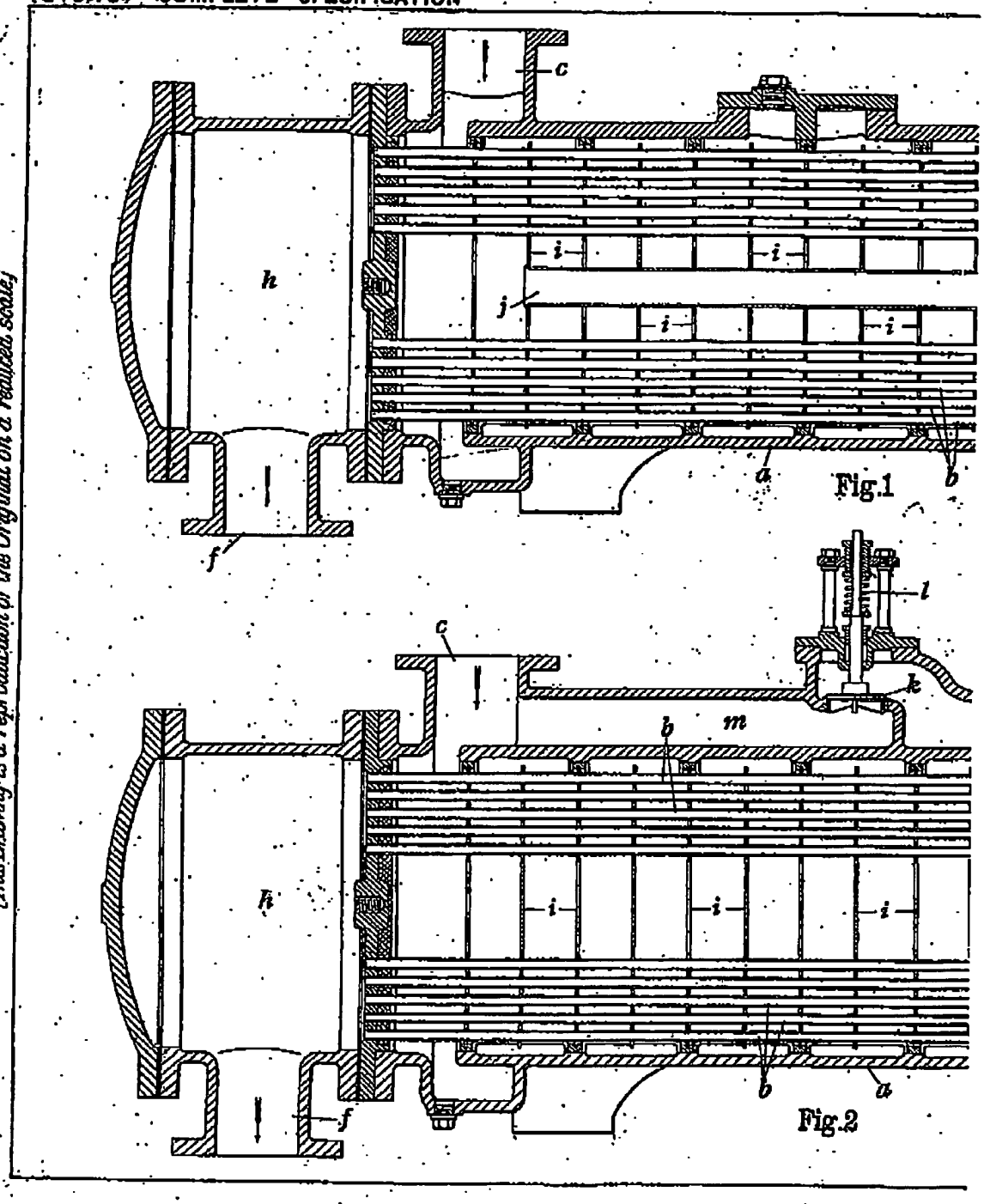
810,157 COMPLETE SPECIFICATION



[This Drawing is a reproduction of the Original on a reduced scale]

1 SHEET